



LCM3399 核心模块
产品手册
V1.0

上海临滴科技有限公司

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1 产品概述

1.1 产品描述

LCM3399 基于瑞芯微 RK3399 芯片平台设计的一款全功能核心模块，尺寸 82mm*63mm。核心模块与底板的连接采用标准 MXM3.0 卡座连接器，并通过 4 颗 M3 的螺丝固定，牢固可靠也易于安装和维修。金手指部分采用电镀硬金工艺，更耐磨耐腐蚀，相较沉金（软金）工艺，插拔寿命更长。

LCM3399 主要包含 CPU，DDR，eMMC 和 PMU 部分。CPU 为 RK3399；DDR 采用市场主流型号 LPDDR4，双通道 64bit 带宽，更低功耗更快频率，可选 2GB/4GB 配置；eMMC 采用高速 eMMC 5.1 标准，可选 4GB-128GB 多种容量配置；PMU 由 RK808 及多路 DC-DC 和 LDO 组成，CPU 核心电压均支持 DVFS 动态调压。

LCM3399 经过了严格的测试过程管理，可确保长时间稳定可靠工作。可为客户提供以下测试数据参考：功能项测试，电源电压的精度、纹波、过冲、跌落、上升时间及动态范围测试，各路电压上电时序测试，各路关键时钟信号的精度和频偏测试，全负荷工作时的功耗测试，全负荷工作时的温升测试等。

LCM3399 采用模块化的设计理念，将需求相同、要求严格的核心部分单独设计为一个全功能模块，并经过全面的测试和批量化验证。用户基于该模块开发产品，可节省项目开发周期，降低企业成本，提高公司效率。



图 1-1

1.2 产品框图

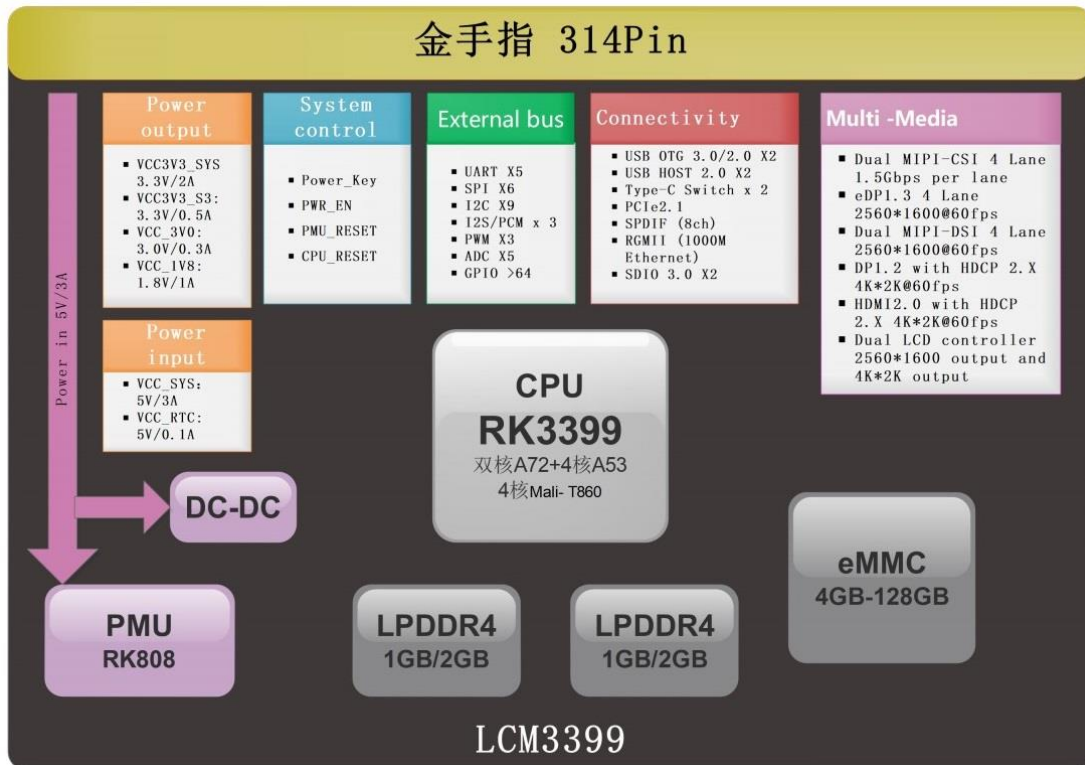


图 1-2

2 外观和尺寸

2.1 产品外观



图 2-1

2.2 产品尺寸

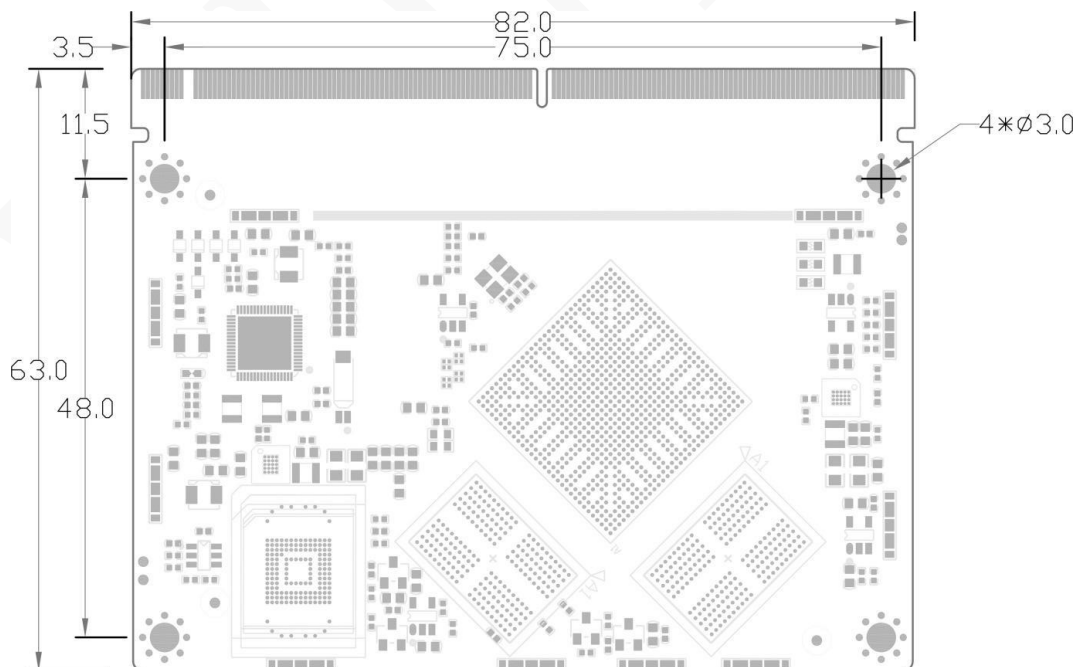


图 2-2

2.3 MXM3.0 连接器

LCM3399 核心板与底板的连接采用标准 MXM3.0 卡座连接器，并可通过 4 颗 M3 的螺丝固定，底板 MXM3.0 连接器尺寸规格如下图：

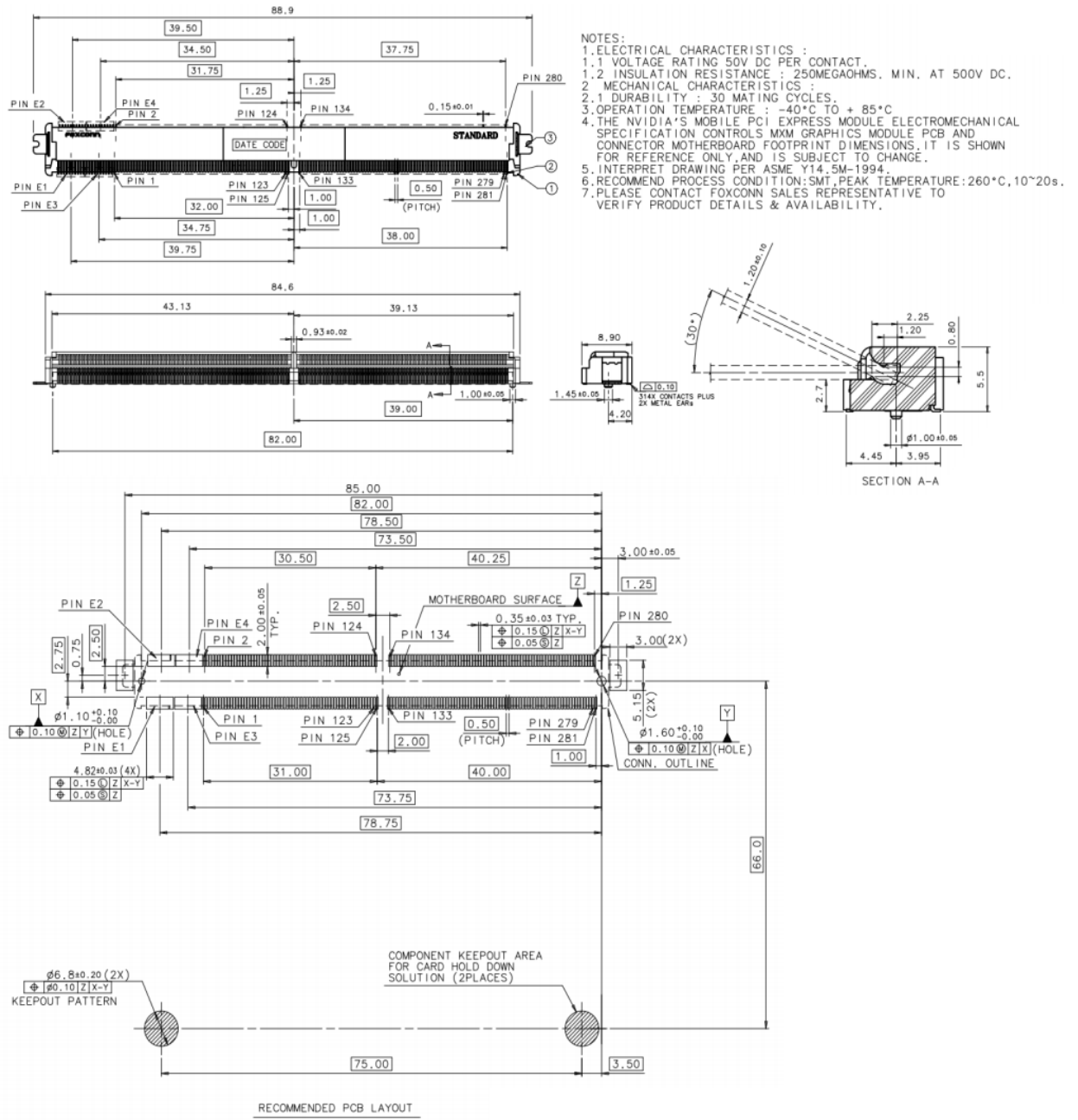


图 2-3

3 产品参数

表 3-1

Function	Description
CPU	RK3399, 28 nm HKMG, Big cluster with dual-coreCortex-A72 + little cluster with quad-core Cortex-A53
GPU	Mali- T860 MP4, OpenGL ES1.1/2.0/3.0/3.1/3.2, OpenCL1.2, DirectX11.1
VPU	4K VP9 and 4K H265 up to 60fps video decoding 1080P@60fps multi-format video decoding (MVC, mpeg-1/2/4, VC-1) 1080P video encoding, with h.264, MVC and VP8 format supported Video anti-cross, de-noising, edge/detail/color optimization supported
DDR	LPDDR4, 2GB/4GB(Optional)
eMMC	eMMC 5.1, 8GB/16GB/32GB/64GB/128GB(Optional)
PMU	RK808, Support a variety of power supply
Camera Interface	Two ISP built-in Dual MIPI-CSI 4 Lane of 1.5 Gbps/Lane ITU-R BT 601/656 compliant Maximum input resolution of one ISP is 14M pixels
Display Interface	Two VOP embedded Dual MIPI-DSI 4 Lane of 1.5 Gbps/Lane up to 2560x1600@60fps eDP1.3 4 Lane of 2.7/1.62 Gbps/lane DP1.2 4 Lane with HDCP2.2 up to 4kx2k at 60Hz resolution HDMI2.0 3 Lane with HDCP2.2
USB Interface	OTG*1, HOST*2, TYPE-C*2
TYPE-C Interface	Dual Type-C PHY with Type-C V1.1 and USB PD2.0 Attach/detach detection and signaling as DFP, UFP and DRP Support USB3.0 Type-C and DisplayPort 1.2 Alt Mode Up to 5Gbps data rate for USB3.0 Up to 5.4Gbps (HBR2) data rate for DP1.2
Audio Interface	Two I2S/PCM built-in up to 8 channels TX and 8 channels RX SPDIF supported Audio resolution from 16bits to 32bits Sample rate up to 192KHz Provides master and slave work mode, software configurable Support 3 I2S formats (normal, left-justified, right-justified) Support 4 PCM formats (early, late1, late2, late3) Support two 16-bit audio data store together in one 32-bit wide location Support 16, 20, 24 bits audio data transfer in linear PCM mode
Connectivity	Compatible with SDIO 3.0 protocol GMAC 10/100/1000M Ethernet Controller Six on-chip SPI controllers Five on-chip UART controllers inside

	<p>Eight on-chip I2C controllers</p> <p>Five groups of GPIO (GPIO0~GPIO4), totally have 100+ GPIOs</p> <p>One PCIe port compatible with PCI Express V2.1 and dual operation mode (RC and EP)</p> <p>Five-channel single-ended 10-bit SAR-ADC up to 1MS/s sampling rate</p>
OS	Android / Ubuntu / Buildroot
PCB size	L*W (mm): 82 * 63 (PCB 1.2mm)
PCB interface	MXM3.0, 314 Pin

4 接口定义

4.1 pin 脚编号

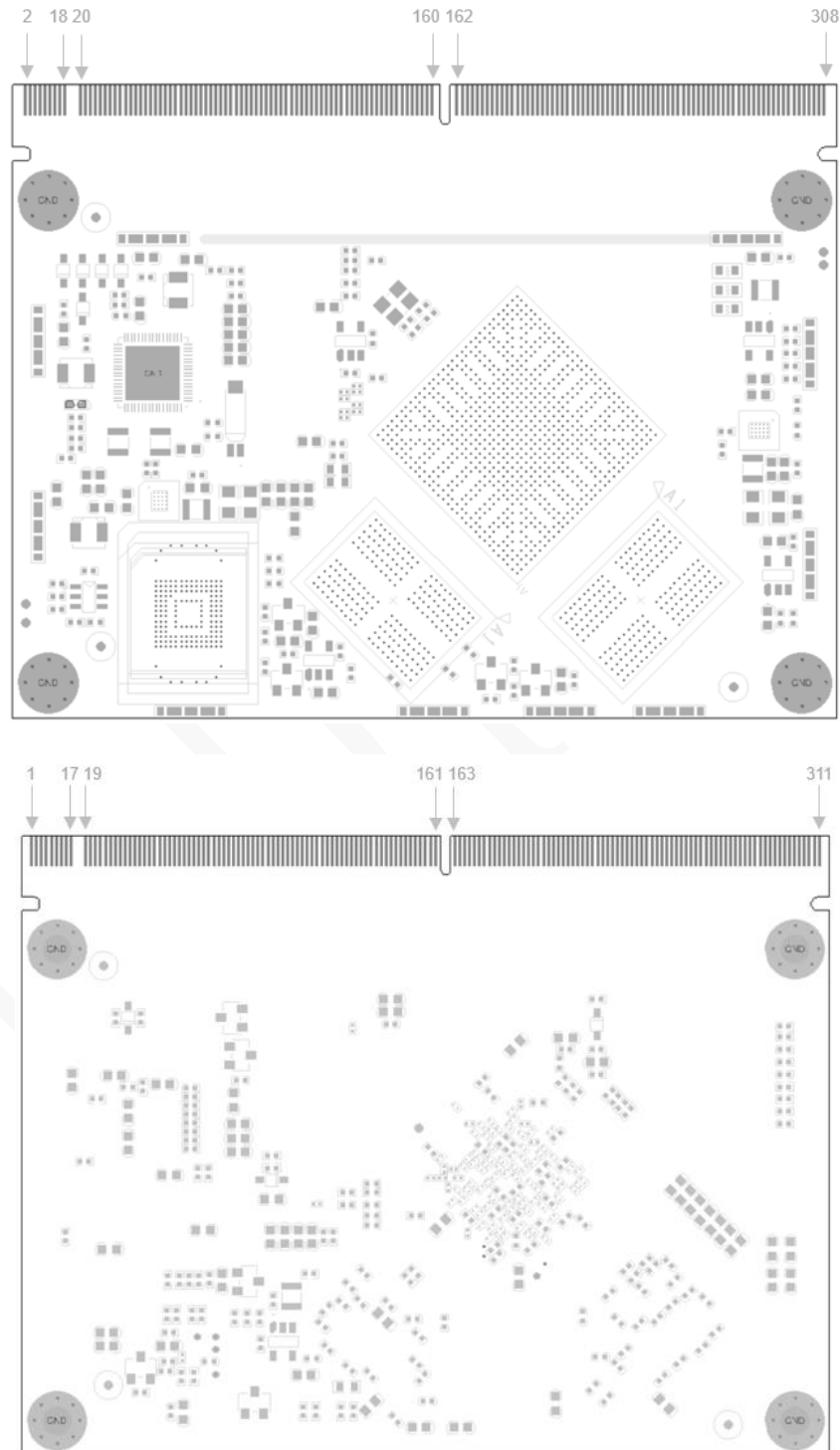


图 4-1

4.2 pin 脚描述

表 4-2

Pin Number	Pin Name	Pin Type	I/O Pull	Description	Power Domain
1	VCC_SYS	Main Power IN	N/A	Power for system 5V/3A	N/A
2	GND-1	GND	N/A	GND	N/A
3	VCC_SYS	Main Power IN	N/A	Power for system 5V/3A	N/A
4	GND-2	GND	N/A	GND	N/A
5	VCC_SYS	Main Power IN	N/A	Power for system 5V/3A	N/A
6	GND-3	GND	N/A	GND	N/A
7	VCC_SYS	Main Power IN	N/A	Power for system 5V/3A	N/A
8	GND-4	GND	N/A	GND	N/A
9	VCC_SYS	Main Power IN	N/A	Power for system 5V/3A	N/A
10	GND-5	GND	N/A	GND	N/A
11	VCC_SYS	Main Power IN	N/A	Power for system 5V/3A	N/A
12	GND-6	GND	N/A	GND	N/A
13	VCC_SYS	Main Power IN	N/A	Power for system 5V/3A	N/A
14	GND-7	GND	N/A	GND	N/A
15	VCC_SYS	Main Power IN	N/A	Power for system 5V/3A	N/A
16	GND-8	GND	N/A	GND	N/A
17	VCC_SYS	Main Power IN	N/A	Power for system 5V/3A	N/A
18	GND-9	GND	N/A	GND	N/A
19	GND-10	GND	N/A	GND	N/A
20	VCC3V3_SYS	3.3V Power OUT	N/A	3.3V/2A out	N/A
21	GPIO3_B3	IO	U	MAC reference clock output I2C serial port 4,need external pull-up	APIO1
22	VCC3V3_SYS	3.3V Power OUT	N/A	3.3V/2A out	N/A
23	GPIO3_B7	IO	U	MAC carrier sense detect	APIO1
24	VCC3V3_SYS	3.3V Power OUT	N/A	3.3V/2A out	N/A
25	GPIO0_A1	IO	U	SDMMC0 power control output	PMUIO1
26	VCC3V3_S3	3.3V Power OUT	N/A	3.3V/500mA out	N/A
27	GPIO3_B5	IO	U	MAC management command and data PCIE reset input	APIO1
28	VCC3V3_S3	3.3V Power OUT	N/A	3.3V/500mA out	N/A
29	GPIO3_B0	IO	U	MAC management clock	APIO1
30	VCC3V3_S3	3.3V Power OUT	N/A	3.3V/500mA out	N/A
31	GPIO3_B2	IO	U	MAC receive error I2C serial port 4,need external pull-up	APIO1
32	GND-31	GND	N/A	GND	N/A
33	GND-11	GND	N/A	GND	N/A
34	VCC_3V0	3.0V Power OUT	N/A	3.0V/300mA out	N/A

35	GPIO3_B4	IO		MAC transmit enable AP wake up PCIE	APIO1
36	VCC_3V0	3.0V Power OUT	N/A	3.0V/300mA out	N/A
37	GPIO3_A1	IO	D	MAC transmit data	APIO1
38	VCC_1V8	1.8V Power OUT	N/A	1.8V/1A out	N/A
39	GPIO3_A0	IO	D	MAC transmit data	APIO1
40	VCC_1V8	1.8V Power OUT	N/A	1.8V/1A out	N/A
41	GPIO3_A5	IO	D	MAC transmit data	APIO1
42	VCC_RTC	RTC Power IN	N/A	RTC voltage input	N/A
43	GPIO3_A4	IO	D	MAC transmit data	APIO1
44	VCC1V8_S3	1.8V Power OUT	N/A	1.8V/1A out	N/A
45	GPIO3_C1	IO	U	MAC transmit clock	APIO1
46	GND-32	GND	N/A	GND	N/A
47	GND-12	GND	N/A	GND	N/A
48	EDP_AUXN	EDP	N/A	eDP differential AUX channel negative output	N/A
49	GPIO3_B1	IO	D	MAC receive data valid	APIO1
50	EDP_AUXP	EDP	N/A	eDP differential AUX channel positive output	N/A
51	GPIO3_A6	IO	U	MAC receive data 0	APIO1
52	GND-33	GND	N/A	GND	N/A
53	GPIO3_A7	IO	U	MAC receive data 1	APIO1
54	EDP_TX0N	EDP	N/A	eDP differential lane 0 negative output	N/A
55	GPIO3_A2	IO	U	MAC receive data 2	APIO1
56	EDP_TX0P	EDP	N/A	eDP differential lane 0 positive output	N/A
57	GPIO3_A3	IO	U	MAC receive data	APIO1
58	GND-34	GND	N/A	GND	N/A
59	GPIO3_B6	IO	U	MAC receive clock	APIO1
60	EDP_TX1N	EDP	N/A	eDP differential lane 1 negative output	N/A
61	GND-13	GND	N/A	GND	N/A
62	EDP_TX1P	EDP	N/A	eDP differential lane 1 positive output	N/A
63	GPIO2_B4	IO	U	Camera power down control output for front	APIO2
64	GND-35	GND	N/A	GND	N/A
65	GPIO2_A0	IO	U	Camera data port 0	APIO2
66	EDP_TX2N	EDP	N/A	eDP differential lane 2 negative output	N/A
67	GPIO2_A1	IO	U	Camera data port 1	APIO2
68	EDP_TX2P	EDP	N/A	eDP differential lane 2 positive output	N/A
69	GPIO2_A2	IO	D	Camera data port 2	APIO2
70	GND-36	GND	N/A	GND	N/A
71	GPIO2_A3	IO	D	Camera data port 3	APIO2
72	EDP_TX3N	EDP	N/A	eDP differential lane 3 negative output	N/A
73	GPIO2_A4	IO	D	Camera data port 4	APIO2
74	EDP_TX3P	EDP	N/A	eDP differential lane 3 positive output	N/A
75	GPIO2_A5	IO	D	Camera data port 5	APIO2
76	GND-37	GND	N/A	GND	N/A

77	GPIO2_A6	IO	D	Camera data port 6	APIO2
78	GPIO3_C0	IO	U	MAC collision detect	APIO1
79	GPIO2_A7	IO	U	Camera data port 7	APIO2
80	GND-38	GND	N/A	GND	N/A
81	GPIO2_B1	IO	U	Camera href input I2C serial port 6, need external pull-up	APIO2
82	GPIO0_B4	IO	D	Type-C0 discharge control	PMUIO1
83	GPIO2_B0	IO	U	Camera vsync input	APIO2
84	GPIO0_A7	IO	U	SDMMC0 detect input	PMUIO1
85	GND-14	GND	N/A	GND	N/A
86	GPIO4_B2	IO	U	SDMMC0 data port 2 JTAG TCK for AP	SDMMC0
87	GPIO2_B2	IO	U	Camera clock input I2C serial port 6, need external pull-up	APIO2
88	GPIO4_B3	IO	U	SDMMC0 data port 3 JTAG TMS for AP	SDMMC0
89	GPIO2_B3	IO	U	Camera clock output	APIO2
90	GPIO4_B5	IO	U	SDMMC0 command output JTAG TMS for MCU	SDMMC0
91	GND-15	GND	N/A	GND	N/A
92	GPIO4_B4	IO	D	SDMMC0 clock output JTAG TCK for MCU	SDMMC0
93	VCC1V8_DVP	1.8V Power OUT	N/A	1.8V/150mA output for camera	N/A
94	GPIO4_B0	IO	U	SDMMC0 data port 0	SDMMC0
95	VCC2V8_DVP	2.8V Power OUT	N/A	2.8V/150mA output for camera	N/A
96	GPIO4_B1	IO	U	SDMMC0 data port 1	SDMMC0
97	VCCA(3V-5V)	PMU Power IN	N/A	power supply for PMU analog	N/A
98	GPIO1_A1	IO	D	COMP Sensor interrupt Charge ok input	PMUIO2
99	GPIO1_A7	IO	U	SPI bus port 1, for FW boot Uart4 serial port data input for PMCU debug	PMUIO2
100	GPIO1_A4	IO	D	ISP_PRELIGHT_TRIG	PMUIO2
101	GPIO1_B0	IO	U	SPI bus port 1, for FW boot Uart4 serial port data output for PMCU debug	PMUIO2
102	GPIO1_A3	IO	D	ISP_FLASHTRIGOUT	PMUIO2
103	GPIO1_B1	IO	U	SPI bus port 1, for FW boot JTAG TCK for PMCU	PMUIO2
104	GPIO1_A0	IO	D	Hall sensor interrupt input COMP Sensor interrupt	PMUIO2
105	GPIO1_B2	IO	U	SPI bus port 1, for FW boot JTAG TMS for PMCU	PMUIO2
106	TYPEC0_U2VBUSDET	USB	N/A	TYPEC0 connected/vbus power detect for USB2.0	N/A
107	GND-16	GND	N/A	GND	N/A

108	TYPEC1_U2VBUSDET	USB	N/A	TYPEC1 connected/vbus power detect for USB2.0	N/A
109	PCIE_RCLK_100M_P	PCIE	N/A	PCIE 100MHz reference clock as input to PLL	N/A
110	GPIO1_C6	IO	D	G-sensor interrupt input	PMUIO2
111	PCIE_RCLK_100M_N	PCIE	N/A	PCIE 100MHz reference clock as input to PLL	N/A
112	GPIO1_C7	IO	D	Adapter insert detect input	PMUIO2
113	GND-17	GND	N/A	GND	N/A
114	GPIO2_D4	IO	D	Camera power down control output for rear	APIO3
115	PCIE_TX0_N	PCIE	N/A	PCIE differential lane 0 negative output	N/A
116	ADC_IN4	ADC	N/A	ADC input 4	SAR ADC
117	PCIE_TX0_P	PCIE	N/A	PCIE differential lane 0 positive output	N/A
118	ADC_IN3	ADC	N/A	ADC input 3	SAR ADC
119	GND-18	GND	N/A	GND	N/A
120	ADC_IN0	ADC	N/A	ADC input 0	SAR ADC
121	PCIE_RX0_N	PCIE	N/A	PCIE differential lane 0 negative input	N/A
122	ADC_IN1	ADC	N/A	ADC input 1	SAR ADC
123	PCIE_RX0_P	PCIE	N/A	PCIE differential lane 0 positive input	N/A
124	ADC_IN2	ADC	N/A	ADC input 2	SAR ADC
125	GND-20	GND	N/A	GND	N/A
126	GND-39	GND	N/A	GND	N/A
127	PCIE_TX1_N	PCIE	N/A	PCIE differential lane 1 negative output	N/A
128	HOST1_DM	USB	N/A	USB HOST1 Data Minus port	N/A
129	PCIE_TX1_P	PCIE	N/A	PCIE differential lane 1 positive output	N/A
130	HOST1_DP	USB	N/A	USB HOST1 Data Plus port	N/A
131	GND-21	GND	N/A	GND	N/A
132	GND-40	GND	N/A	GND	N/A
133	PCIE_RX1_N	PCIE	N/A	PCIE differential lane 1 negative input	N/A
134	HOST0_DM	USB	N/A	USB HOST0 Data Minus port	N/A
135	PCIE_RX1_P	PCIE	N/A	PCIE differential lane 1 positive input	N/A
136	HOST0_DP	USB	N/A	USB HOST0 Data Plus port	N/A
137	GND-22	GND	N/A	GND	N/A
138	GND-41	GND	N/A	GND	N/A
139	PCIE_TX2_N	PCIE	N/A	PCIE differential lane 2 negative output	N/A
140	TYPEC1_AUXP	USB	N/A	TYPEC1 AUX differential TX/RX serial data	N/A
141	PCIE_TX2_P	PCIE	N/A	PCIE differential lane 2 positive output	N/A
142	TYPEC1_AUXM	USB	N/A	TYPEC1 AUX differential TX/RX serial data	N/A
143	GND-23	GND	N/A	GND	N/A
144	GND-42	GND	N/A	GND	N/A
145	PCIE_RX2_N	PCIE	N/A	PCIE differential lane 2 negative input	N/A
146	TYPEC1_TX2M	USB	N/A	TYPEC1 negative half of second SuperSpeed TX differential pair	N/A
147	PCIE_RX2_P	PCIE	N/A	PCIE differential lane 2 positive input	N/A
148	TYPEC1_TX2P	USB	N/A	TYPEC1 positive half of second SuperSpeed TX differential pair	N/A

149	GND-24	GND	N/A	GND	N/A
150	GND-43	GND	N/A	GND	N/A
151	PCIE_TX3_N	PCIE	N/A	PCIE differential lane 3 negative output	N/A
152	TYPEC1_RX2P	USB	N/A	TYPEC1 positive half of second SuperSpeed RX differential pair	N/A
153	PCIE_TX3_P	PCIE	N/A	PCIE differential lane 3 positive output	N/A
154	TYPEC1_RX2M	USB	N/A	TYPEC1 negative half of second SuperSpeed RX differential pair	N/A
155	GND-25	GND	N/A	GND	N/A
156	GND-44	GND	N/A	GND	N/A
157	PCIE_RX3_N	PCIE	N/A	PCIE differential lane 3 negative input	N/A
158	TYPEC1_AUXP_PD_PU	USB	N/A	TYPEC1 AUX pull-up/pull-down polarity reversal pins	N/A
159	PCIE_RX3_P	PCIE	N/A	PCIE differential lane 3 positive input	N/A
160	TYPEC1_AUXM_PU_PD	USB	N/A	TYPEC1 AUX pull-up/pull-down polarity reversal pins	N/A
161	GND-26	GND	N/A	GND	N/A
162	TYPEC1_RX1M	USB	N/A	TYPEC1 negative half of first SuperSpeed RX differential pair	N/A
163	GPIO1_C2	IO	U	Gasgauge interrupt input Motor power enable CC controller over current flag	PMUIO2
164	TYPEC1_RX1P	USB	N/A	TYPEC1 positive half of first SuperSpeed RX differential pair	N/A
165	GPIO1_C4	IO	U	Touch panel interrupt input	PMUIO2
166	TYPEC1_TX1P	USB	N/A	TYPEC1 positive half of first SuperSpeed TX differential pair	N/A
167	GPIO1_B3	IO	U	I2C serial port 4, need external pull-up	PMUIO2
168	TYPEC1_TX1M	USB	N/A	TYPEC1 negative half of first SuperSpeed TX differential pair	N/A
169	GPIO1_B4	IO	U	I2C serial port 4, need external pull-up	PMUIO2
170	TYPEC1_DP	USB	N/A	TYPEC1 Data Plus port	N/A
171	PWR_EN	Power Control	N/A	Adapter voltage detect input	N/A
172	TYPEC1_DM	USB	N/A	TYPEC1 Data Minus port	N/A
173	POWER_ON	Power Control	N/A	Power Key input	N/A
174	TYPEC0_TX2M	USB	N/A	TYPEC0 negative half of second SuperSpeed TX differential pair	N/A
175	GPIO1_D0	IO	D	Gyroscope interrupt input FUSB302 interrupt input for Type-C1	PMUIO2
176	TYPEC0_TX2P	USB	N/A	TYPEC0 positive half of second SuperSpeed TX differential pair	N/A
177	GPIO0_A6	IO	D	Power dynamic voltage scaling control for CENTERLOG IR receiver input	PMUIO1
178	TYPEC0_RX2P	USB	N/A	TYPEC0 positive half of second SuperSpeed RX differential pair	N/A

179	GPIO0_B5	IO	D	Type-C1 discharge control Hall Sensor interrupt input	PMUIO1
180	TYPECO_RX2M	USB	N/A	TYPECO negative half of second SuperSpeed RX differential pair	N/A
181	NPOR_U	RESET	N/A	CPU reset	N/A
182	TYPECO_DM	USB	N/A	TYPECO Data Minus port	N/A
183	GPIO0_A2	IO	D	26MHz clock output	PMUIO1
184	TYPECO_DP	USB	N/A	TYPECO Data Plus port	N/A
185	GPIO0_B0	IO	U	DVP power enable	PMUIO1
186	TYPECO_TX1M	USB	N/A	TYPECO negative half of first SuperSpeed TX differential pair	N/A
187	GPIO0_A5	IO	U	Power key detect input	PMUIO1
188	TYPECO_TX1P	USB	N/A	TYPECO positive half of first SuperSpeed TX differential pair	N/A
189	GPIO2_D3	IO	D	MIPI camera reset output MEMSI interrupt input	APIO3
190	TYPECO_RX1P	USB	N/A	TYPECO positive half of first SuperSpeed RX differential pair	N/A
191	GPIO4_C7	IO	U	HDMI CEC communication	APIO4
192	TYPECO_RX1M	USB	N/A	TYPECO negative half of first SuperSpeed RX differential pair	N/A
193	PORT_HPDP	HDMI	N/A	HDMI Hot Plug Detection interrupt with 5V tolerance	N/A
194	TYPECO_AUXP	USB	N/A	TYPECO AUX differential TX/RX serial data	N/A
195	GPIO4_C1	IO	U	I2C serial port 3, for HDMI, need external pull-up	APIO4
196	TYPECO_AUXM	USB	N/A	TYPECO AUX differential TX/RX serial data	N/A
197	GPIO4_C0	IO	U	I2C serial port 3, for HDMI, need external pull-up	APIO4
198	TYPECO_AUXM_PU_PD	USB	N/A	TYPECO AUX pull-up/pull-down polarity reversal pins	N/A
199	GPIO1_A2	IO	D	Charge and cc controller interrupt input	PMUIO2
200	TYPECO_AUXP_PD_PU	USB	N/A	TYPECO AUX pull-up/pull-down polarity reversal pins	N/A
201	RTC_CLK_OUT	CLK OUT	N/A	32KHZ clock output	N/A
202	GND-45	GND	N/A	GND	N/A
203	GND-27	GND	N/A	GND	N/A
204	HDMI_TX2P	HDMI	N/A	HDMI channel 2 differential serial data positive	N/A
205	GPIO0_A4	IO	D	BT module wake up AP	PMUIO1
206	HDMI_TX2N	HDMI	N/A	HDMI channel 2 differential serial data negative	N/A
207	GPIO2_D2	IO	U	AP wake up BT module	APIO3
208	HDMI_TX1P	HDMI	N/A	HDMI channel 1 differential serial data positive	N/A
209	GPIO2_C3	IO	U	UART0 serial port, for BT module	APIO3
210	HDMI_TX1N	HDMI	N/A	HDMI channel 1 differential serial data negative	N/A
211	GPIO2_C2	IO	U	UART0 serial port, for BT module	APIO3
212	HDMI_TX0P	HDMI	N/A	HDMI channel 0 differential serial data positive	N/A
213	GPIO2_C1	IO	U	UART0 serial port, for BT module	APIO3
214	HDMI_TX0N	HDMI	N/A	HDMI channel 0 differential serial data negative	N/A

215	GPIO2_C0	IO	U	UART0 serial port, for BT module	APIO3
216	HDMI_TCP	HDMI	N/A	HDMI differential pixel clock positive	N/A
217	GPIO0_B1	IO	D	BT module power enable	PMUIO1
218	HDMI_TCN	HDMI	N/A	HDMI differential pixel clock negative	N/A
219	GPIO2_C5	IO	U	SDIO0 data port, for WIFI module	APIO3
220	GND-46	GND	N/A	GND	N/A
221	GPIO2_C4	IO	U	SDIO0 data port, for WIFI module	APIO3
222	MIPI_TX0_D0P	MIPI TX	N/A	MIPI-DSI0 differential lane 0 positive	N/A
223	GPIO2_C6	IO	U	SDIO0 data port, for WIFI module	APIO3
224	MIPI_TX0_D0N	MIPI TX	N/A	MIPI-DSI0 differential lane 0 negative	N/A
225	GPIO2_C7	IO	U	SDIO0 data port, for WIFI module	APIO3
226	GND-47	GND	N/A	GND	N/A
227	GPIO2_D1	IO	U	SDIO0 clock output, for WIFI module	APIO3
228	MIPI_TX0_D1P	MIPI TX	N/A	MIPI-DSI0 differential lane 1 positive	N/A
229	GPIO2_D0	IO	U	SDIO0 command output, for WIFI module	APIO3
230	MIPI_TX0_D1N	MIPI TX	N/A	MIPI-DSI0 differential lane 1 negative	N/A
231	GPIO0_A3	IO	D	WIFI module wake up AP	PMUIO1
232	GND-48	GND	N/A	GND	N/A
233	GPIO0_B2	IO	D	WIFI module power enable	PMUIO1
234	MIPI_TX0_CLKP	MIPI TX	N/A	MIPI-DSI0 differential clock lane positive	N/A
235	GND-28	GND	N/A	GND	N/A
236	MIPI_TX0_CLKN	MIPI TX	N/A	MIPI-DSI0 differential clock lane negative	N/A
237	RTC_CLKO_WIFI	CLK OUT	N/A	32KHZ clock output	N/A
238	GND-49	GND	N/A	GND	N/A
239	EXT_EN	Power Control	N/A	external DC-DC enable	N/A
240	MIPI_TX0_D2P	MIPI TX	N/A	MIPI-DSI0 differential lane 2 positive	N/A
241	OTP_RST	RESET	N/A	PMU reset input	N/A
242	MIPI_TX0_D2N	MIPI TX	N/A	MIPI-DSI0 differential lane 2 negative	N/A
243	TYPEC1_ID	USB	N/A	TYPEC1 ID detect input	N/A
244	GND-50	GND	N/A	GND	N/A
245	TYPEC0_ID	USB	N/A	TYPEC0 ID detect input	N/A
246	MIPI_TX0_D3P	MIPI TX	N/A	MIPI-DSI0 differential lane 3 positive	N/A
247	GPIO4_D4	IO	D	Headphone insert detect input	APIO4
248	MIPI_TX0_D3N	MIPI TX	N/A	MIPI-DSI0 differential lane 3 negative	N/A
249	GPIO4_D5	IO	D	LCD panel CABC enable LCD panel reset output	APIO4
250	GND-51	GND	N/A	GND	N/A
251	GPIO4_C4	IO	U	Uart2 serial port data output, for AP debug	APIO4
252	MIPI_RX0_D0P	MIPI RX	N/A	MIPI-CSI0 differential lane 0 positive	N/A
253	GPIO4_C3	IO	U	Uart2 serial port data input, for AP debug	APIO4
254	MIPI_RX0_D0N	MIPI RX	N/A	MIPI-CSI0 differential lane 0 negative	N/A
255	GPIO4_D3	IO	D	EFUSE VPQS power control output	APIO4
256	GND-52	GND	N/A	GND	N/A

257	GPIO4_D0	IO	U	ALS sensor interrupt input	APIO4
258	MIPI_RX0_D1P	MIPI RX	N/A	MIPI-CSIO differential lane 1 positive	N/A
259	GPIO4_D1	IO	D	USB HOST power control output	APIO4
260	MIPI_RX0_D1N	MIPI RX	N/A	MIPI-CSIO differential lane 1 negative	N/A
261	GPIO4_D2	IO	D	Camera power down control output for rear	APIO4
262	GND-53	GND	N/A	GND	N/A
263	GPIO4_C6	IO	D	Touch panel reset input	APIO4
264	MIPI_RX0_CLKP	MIPI RX	N/A	MIPI-CSIO differential clock lane positive	N/A
265	GPIO4_C2	IO	D	LCD panel backlight brightness control output	APIO4
266	MIPI_RX0_CLKN	MIPI RX	N/A	MIPI-CSIO differential clock lane negative	N/A
267	VCCA3V0_CODEEC	3.0V Power OUT	N/A	3.0V/300mA output for audio codec	N/A
268	GND-54	GND	N/A	GND	N/A
269	VCCA3V0_CODEEC	3.0V Power OUT	N/A	3.0V/300mA output for audio codec	N/A
270	MIPI_RX0_D2P	MIPI RX	N/A	MIPI-CSIO differential lane 2 positive	N/A
271	VCCA1V8_CODEEC	1.8V Power OUT	N/A	1.8V/300mA output for audio codec	N/A
272	MIPI_RX0_D2N	MIPI RX	N/A	MIPI-CSIO differential lane 2 negative	N/A
273	VCCA1V8_CODEEC	1.8V Power OUT	N/A	1.8V/300mA output for audio codec	N/A
274	GND-55	GND	N/A	GND	N/A
275	GND-29	GND	N/A	GND	N/A
276	MIPI_RX0_D3P	MIPI RX	N/A	MIPI-CSIO differential lane 3 positive	N/A
277	GPIO3_D0	IO	D	I2S 0 port, for audio codec	APIO5
278	MIPI_RX0_D3N	MIPI RX	N/A	MIPI-CSIO differential lane 3 negative	N/A
279	GPIO3_D1	IO	D	I2S 0 port, for audio codec	APIO5
280	GND-56	GND	N/A	GND	N/A
281	GPIO3_D2	IO	D	I2S 0 port, for audio codec	APIO5
282	MIPI_TX1/RX1_D3P	MIPI TX/RX	N/A	MIPI-DSI1/CSI1 differential lane 3 positive	N/A
283	GPIO3_D3	IO	D	I2S 0 port, for audio codec	APIO5
284	MIPI_TX1/RX1_D3N	MIPI TX/RX	N/A	MIPI-DSI1/CSI1 differential lane 3 negative	N/A
285	GPIO3_D4	IO	D	I2S 0 port, for audio codec	APIO5
286	GND-57	GND	N/A	GND	N/A
287	GPIO3_D5	IO	D	I2S 0 port, for audio codec	APIO5
288	MIPI_TX1/RX1_D2P	MIPI TX/RX	N/A	MIPI-DSI1/CSI1 differential lane 2 positive	N/A
289	GPIO3_D6	IO	D	I2S 0 port, for audio codec	APIO5
290	MIPI_TX1/RX1_D2N	MIPI TX/RX	N/A	MIPI-DSI1/CSI1 differential lane 2 negative	N/A
291	GPIO3_D7	IO	D	I2S 0 port, for audio codec	APIO5
292	GND-58	GND	N/A	GND	N/A
293	GPIO4_A0	IO	D	I2S MCLK, for both I2S0 and I2S1	APIO5
294	MIPI_TX1/RX1_CLKP	MIPI TX/RX	N/A	MIPI-DSI1/CSI1 differential clock lane positive	N/A
295	GPIO4_A3	IO	D	HDMI input power enable for VCC1V8 I2S 1 port, for BT module	APIO5
296	MIPI_TX1/RX1_CLKN	MIPI TX/RX	N/A	MIPI-DSI1/CSI1 differential lane 0 positive	N/A
297	GPIO4_A4	IO	D	HDMI input reset output I2S 1 port, for BT module	APIO5

298	GND-59	GND	N/A	GND	N/A
299	GPIO4_A5	IO	D	HDMI input interrupt input I2S 1 port, for BT module	APIO5
300	MIPI_TX1/RX1_D1P	MIPI TX/RX	N/A	MIPI-DS11/CSI1 differential lane 1 positive	N/A
301	GPIO4_A6	IO	D	HDMI input standby enable I2S 1 port, for BT module	APIO5
302	MIPI_TX1/RX1_D1N	MIPI TX/RX	N/A	MIPI_TX1/RX1_D1N	N/A
303	GPIO4_A7	IO	D	I2S 1 port, for BT module	APIO5
304	GND-60	GND	N/A	GND	N/A
305	GND-30	GND	N/A	GND	N/A
306	MIPI_TX1/RX1_D0P	MIPI TX/RX	N/A	MIPI-DS11/CSI1 differential lane 0 positive	N/A
307	GPIO4_A1	IO	U	I2C serial port 1, need external pull-up	APIO5
308	MIPI_TX1/RX1_D0N	MIPI TX/RX	N/A	MIPI-DS11/CSI1 differential lane 0 positive	N/A
309	GPIO4_A2	IO	U	I2C serial port 1, need external pull-up	APIO5
311	GPIO4_C5	IO	D	HDMI digital audio optical output	APIO4
<p>Notes:</p> <p>Pin Type: I = input, O = output, I/O = input/output (bidirectional);</p> <p>I/O Pull: u=default pull-up, d=default pull-down, Z=default high-Z;</p>					

4.3 电压域说明

表 4-3

Symbol	Min (V)	Typ (V)	Max (V)	Notice
PMUIO1	1.62	1.8	1.98	Always on
PMUIO2	2.85	3.0	3.15	Always on
SDMMC0	2.85	3.0	3.15	Sleep off
SAR ADC	1.62	1.8	1.98	Sleep off
APIO1	3.135	3.3	3.465	Sleep off
APIO2	1.71	1.8	1.89	Sleep off
APIO3	1.62	1.8	1.98	Always on
APIO4	2.85	3.0	3.15	Always on
APIO5	1.71	1.8	1.89	Sleep off

5 电源设计

5.1 电源供电拓扑图

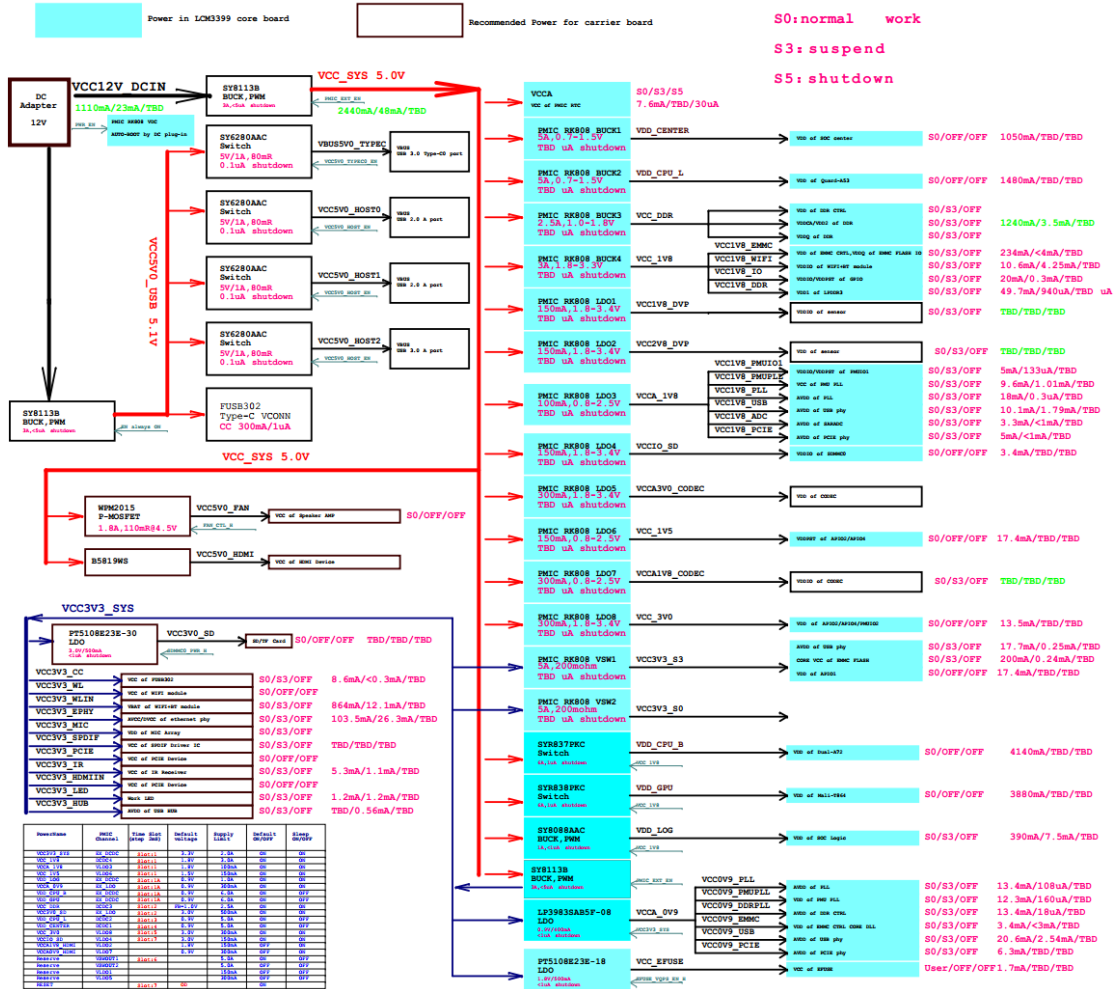


图 5-1

5.2 电压参数

表 5-2

Symbol	Parameter	Current Typ	Voltage		
			Min (V)	Typ (V)	Max (V)
VCC_SYS	Main power input for LCM3399	3A	3.5	5	5.5
VCCA	Backup voltage input for RTC and power on detect	60uA	VCC_SYS-0.5	VCC_SYS	5.5
VCC3V3_SYS	3.3V output for carrier board use	2A	3.2	3.3	3.4
VCC3V3_S3	3.3V output for carrier board use	0.5A	3.2	3.3	3.4
VCC_3V0	3.0V output for carrier board use	0.2A	2.9	3.0	3.1
VCC_1V8	1.8V output for carrier board use	1A	1.7	1.8	1.9
VCC1V8_S3	1.8V output for carrier board use	1A	1.7	1.8	1.9

VCC1V8_DVP	1.8V output for carrier board use	0.15A	1.7	1.8	1.9
VCC2V8_DVP	2.8V output for carrier board use	0.15A	2.7	2.8	2.9
VCCA1V8_CODEC	1.8V output for carrier board use	0.3A	1.7	1.8	1.9
VCCA3V0_CODEC	3.0V output for carrier board use	0.3A	2.9	3.0	3.1
PMIC_EXT_EN	Output enable for external BUCK	-	0	VCCA	VCCA+0.3
PWR_EN (threshold)	System Power on signal input	-	3	5	12

5.3 开机时序

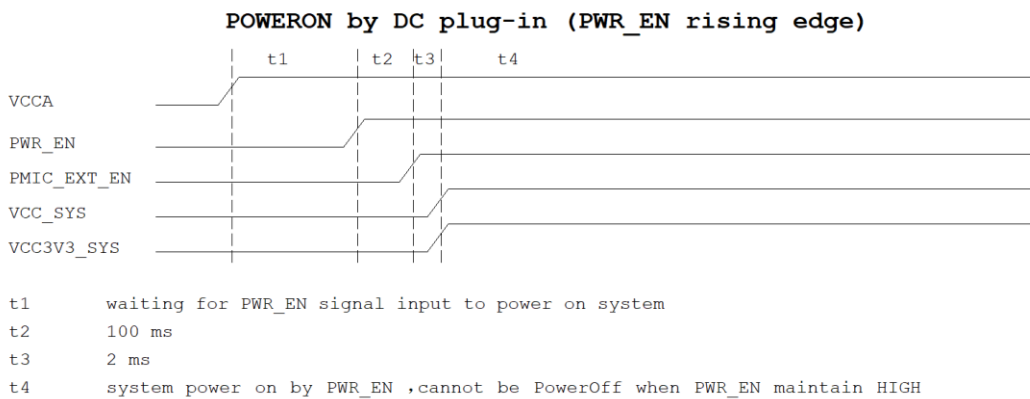


图 5-3

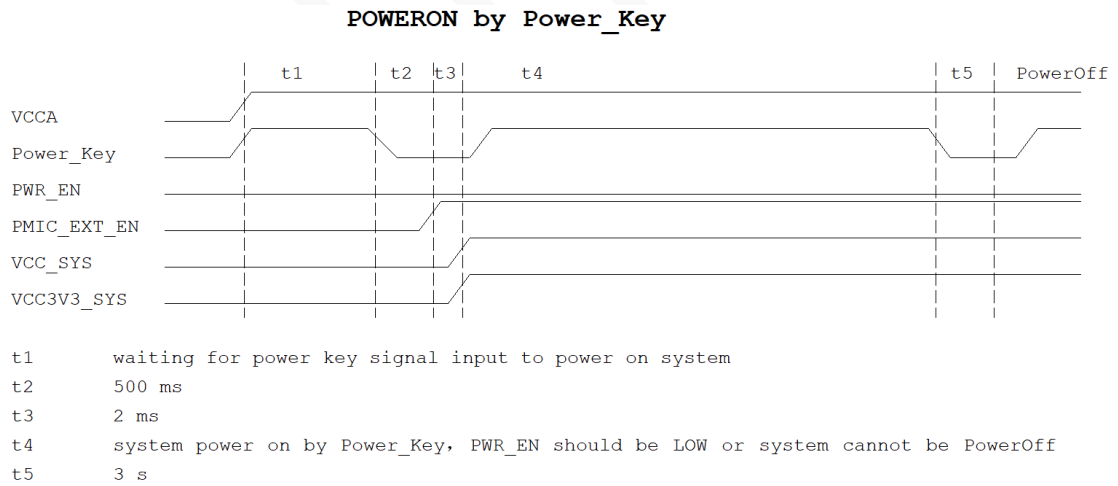


图 5-4

6 应用场景

6.1 应用示例



智能零售



机器视觉



智能安防



多屏交互



辅助驾驶



智慧校园

图 6-1

6.2 应用设计框图

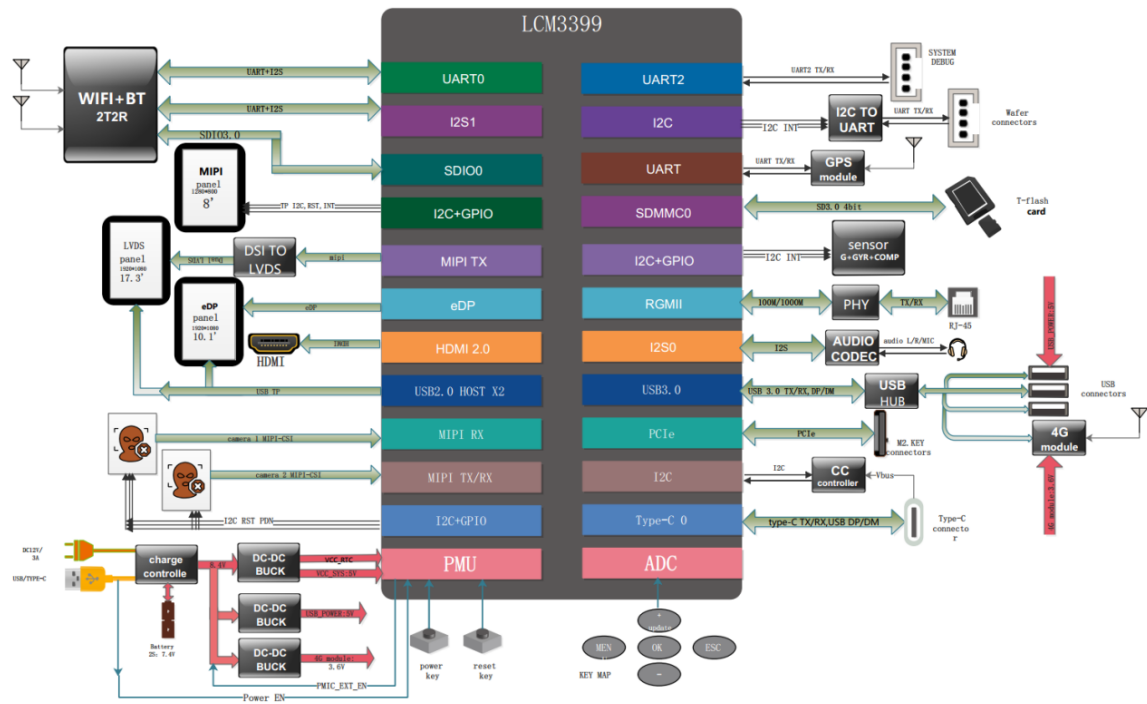


图 6-2

7 支持与服务

7.1 技术支持

- 为客户提供开发相关的技术咨询；
- 为签约客户提供相关设计资料的检查工作；

7.2 售后服务

- 按照国家规定提供产品售后服务；
- 为客户提供个性化定制服务，如有任何需求，请联系我司；